
National Resource Requirements for Abortion Services

ABORTION HAS BEEN USED to limit population since ancient times (1). Although the practice is not generally approved by some societies, abortion remains a widespread method of fertility control throughout the world (2). On January 22, 1973, the U.S. Supreme Court removed most restrictions on the practice of abortion, a decision that closely followed a dramatic, favorable shift in public attitudes (3). As a result of the Court's decision, nationwide demands on the health care delivery system for abortion-related services are expected to increase.

Although the exact number of abortions that may be requested and the subsequent demands for health resources are difficult to determine, we have attempted to estimate both the number of U.S. women who might seek an abortion and the resources that will be needed from the health care system in response to this demand. Our efforts are presented here in response to the recommendations of the Presidential Commission on Population Growth and the American Future, which called for "a substantially greater effort focusing on policy-oriented research and analysis of population in the United States" (4).

Methods, Facilities, and Technology

Technological advances have radically affected the provision of abortion services. During the early and middle sixties, the most frequent method for first-trimester abortion was dilatation and curettage of the uterus; hysterotomy and hyster-

ectomy were usually reserved for more advanced pregnancies. With the recent increase in the use of vacuum aspiration and transabdominal intra-amniotic injection of hypertonic saline solution, however, the use of dilatation and curettage and hysterotomy has declined. Furthermore, the use of vacuum aspiration has resulted in a substantial increase in the use of hospital outpatient facilities and of freestanding clinics apart from hospitals (5).

As the number of abortions has increased, resulting from technological advances and changes in public attitudes, increasingly extensive information has been collected from epidemiologic studies (6-9) that is useful for estimating the number of women who might seek an abortion in a non-restrictive environment.

Based on abortion studies conducted during the early and middle sixties, legal abortions performed in hospitals were estimated to be about 8,000 per year—a rate of 2 abortions to 1,000 live births. Of these abortions, about 40 percent were performed on the basis of psychiatric indications and 25 percent because of maternal rubella (2). That abortion services during these years were not equally accessible to all women seeking them (10) is indicated by (a) the higher incidence of abortions in proprietary hospitals, more often used by women who can pay for service, than in municipal hospitals that are often used by indigent women (11) and (b) the higher percentage of all maternal deaths attributed to the con-

sequences of induced abortion among nonwhite women, who more frequently sought illegal abortions.

Reports of recent studies (8,12), conducted after changes in the laws of several States, particularly New York, reveal vastly increased numbers of legal abortions. The national surveillance activities of the Center for Disease Control (CDC) indicate that 180,000 legal abortions were performed throughout the United States and reported to CDC in 1970. CDC further estimates that approximately 197,000 to 236,000 abortions were actually performed during that year (12). For

1971, CDC reported that 480,259 legal abortions were reported throughout the country (8). Although the number of abortions performed in 1972 has not yet been reported by CDC, it is expected to exceed the number reported for 1971.

While some of the increase in number of abortions may be attributed to the expansion of the reporting network, it is unlikely that this is the major factor. Thus, application of the rates of abortions performed on women aged 15-49 in four States during 1971 (8) to Census Bureau projections of the number of women aged 15-49 for 1973 and 1975 (13) yields an estimate of

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Table 1. Estimates of potential numbers of abortions in the United States for 1973 and 1975, based on the number of abortions nationwide and in 4 States in 1971¹

Location	Number of abortions, 1971 ²	Number of women aged 15-49, 1970 ³	Rate of abortions per 100,000 women aged 15-49, 1970	Number of estimated and projected abortions for 1973 and 1975 ⁴	
				1973	1975
Nationwide.....	480,259	48,701,499	986	507,425	524,434
Oregon.....	6,984	496,727	1,406	723,570	747,823
California.....	103,678	4,923,738	2,106	1,083,810	1,120,139
Hawaii.....	4,121	193,752	2,127	1,094,618	1,131,308
New York.....	105,635	4,429,267	2,385	1,227,392	1,268,534

¹The latest year for which nationwide data have been reported by the Center for Disease Control.

²State residents only; reference 8, table 3, 1971 abortions as reported to CDC.

³Source: General Population Characteristics, United States Summary, U.S. Bureau of the Census.

⁴Estimates and projections computed as follows: for each State, the ratio of 1971 abortions to number of women aged 15-49 was multiplied by the 1973 and 1975 projections of the nationwide number of women aged 15-49; reference 13, table 2.

the expected number of abortions, if we assume that nationwide behavior is reflected in the activity of the four States—Oregon, California, Hawaii, and New York—as shown in table 1.

The number of abortions which might be performed annually, based on the Supreme Court's nonrestrictive guidelines, can therefore be estimated by applying the abortion rates in States where abortion services were readily available to national population projections. Limitations to this approach include (a) the lack of national homogeneity, (b) a variety of issues related to the availability of medical services, (c) changing patterns of contraceptive use, and (d) attitudes toward abortion.

Of the States with nonrestrictive abortion laws before the Court's ruling (California, New York, and Hawaii), the rate for New York was selected for projection. New York reported the highest rate of abortions of any State; presumably, this reflects the highly nonrestrictive conditions, wide availability of services, and considerable public awareness in New York. Oregon's and the 1971 nationwide abortion rates, which are somewhat lower, were used to develop alternative projections. According to CDC (8), few women in Oregon and New York sought abortions outside their State of residence.

Requirements for Medical Services

Translation of the estimates and projections of table 1 into requirements for medical services was achieved through the application of a quan-

titative health planning framework (14). This computer-based model of the abortion services system permitted the projection—based on specified descriptive variables—of mortality, morbidity, costs, physician man-hours, and hospital patient-bed day requirements. The same framework was applied to an analysis of the effects on resource requirements of an educational program resulting in an increased percentage of women seeking abortion in their first trimester when vacuum aspiration can be performed. Finally, the economic efficiencies of outpatient abortion were examined through the framework.

The selection of appropriate epidemiologic data for use in projecting is complicated by a lack of uniform reporting, incomplete followup of patients after abortion, and the use of nonuniform criteria for defining complications. Planning must therefore be somewhat subjective. As a result, the considerable data required to formulate the projections were selected from many sources. Some of these data follow, and the remainder may be requested from us.

The data used for this study included information from (a) the national surveillance efforts of the Center for Disease Control (12), discussed earlier, (b) the Joint Program for the Study of Abortion (JPSA) of the Population Council, which monitored abortions and complications in participating facilities (15,16), and (c) records of the New York City Health Department (9).

The JPSA reports (6) indicated that among participating hospitals, about 63 percent of the

vacuum aspiration and 55 percent of the sharp curettage procedures were performed on an out-patient basis. Of the hysterotomy patients in the JPSA study group, 85 percent underwent concurrent tubal ligation. Other sterilization procedures were excluded from this study.

In selecting morbidity and mortality data for use in the projections, we used the following criteria: (a) series with followup were the most preferable and (b) when more than one series of data were available to provide the same information, the series with higher complication rates were selected so that the projections would allow for a wider range of potential complications under nationwide conditions.

Since morbidity reports vary somewhat because of different definitions of complications, the definitions included here are based primarily on the rationale that complications that require further medical treatment, and thus additional resources, are of interest in planning. In addition to morbidity that can be medically treated, re-operation may be required as a result of complications. Although limited information on rates of re-operation is available (16), complete procedure-specific reporting of re-operations is lacking.

Family planning and medical followup data also were required. Although the JPSA study indicated that 63 percent of the abortion patients who lived within the vicinity of the participating hospitals received some form of followup care,

various hospitals reported that 70 to 80 percent of the patients were also provided with family planning assistance at the time of the first post-partum visit. Of course, this figure can vary considerably depending on the type of facility, its location, and the patients who use its services.

Finally, medical resource requirements were measured by estimating physician man-hours, hospital patient-bed days, and fiscal requirements (based on information that we collected from facility administrators and gynecologists in clinical practice during 1971 and 1972). Physician man-hours reflect only the time required to actually perform the procedure. Although actual time with the patient may be considerably greater, especially for physicians in private practice, under the efficient conditions which exist in most out-patient abortion clinics these man-hour allocations probably approximate the physician's time with a patient. Hospital days were estimated according to average number of days in the hospital. Finally, cost estimates were based on the estimated cost of providing the services rather than actual charges to the patient.

Resource Projections

Application of the projections of estimated numbers of abortions in the United States for selected States (table 1) to the available data yields estimates of needed medical care resources (table 2). At recent nationwide levels of 480,259

Table 2. Projections of the number of abortions in 1973 and 1975 and estimates of the costs of services, hospital patient-bed days, and physician man-hour requirements, based on 1971 abortion rates nationwide and in Oregon and New York State¹

Condition for projections and estimates ²	Total costs for services (millions) ³	Hospital patient-bed days (thousands)	Physician man-hours (thousands)
Based on nationwide:			
1973: 507,425 abortions.....	\$134.688	432.102	304.794
1975: 524,434 abortions.....	139.108	446.282	313.822
Based on Oregon:			
1973: 723,570 abortions.....	192.888	618.818	436.499
1975: 747,823 abortions.....	198.485	636.773	449.163
Based on New York:			
1973: 1,227,392 abortions.....	325.572	1,044.490	736.755
1975: 1,268,534 abortions.....	336.429	1,079.320	761.324

¹ The assumptions upon which these projections and estimates and those of tables 3-5 are based are contained in the text and in the supplementary tables available upon request from the authors.

² Number of abortions from table 1.
³ 1972 dollars; based on the costs of providing services, not patient charges.

abortions each year, about 1,140 hospital beds and 148 gynecologists allocated solely to abortion services for 1 year would be required. Since there are approximately 20,000 gynecologists in the United States, each gynecologist need allocate only about 14 hours a year to providing abortion services. Even if only half the gynecologists were willing to perform abortions and assuming 50 percent efficiency, each of the willing gynecologists would have to allocate only slightly more than 1 week each year to abortion services.

At the level of about 730,000 abortions each year, 1,760 hospital beds and 225 full-time gynecologists would be required. And to perform about 1.2 million abortions each year, slightly fewer than 3,000 hospital beds and 400 full-time gynecologists are needed. Alternatively, each U.S. gynecologist could perform 40 hours per year of abortion-related work, or half the gynecologists at 80 hours per year. At 50 percent efficiency and assuming no other physicians performing abortions, this implies about 5 weeks of abortion services each year.

Although fiscal requirements range up to \$336 million annually for 1.2 million abortions, maternity costs for these pregnancies—if permitted to continue to term—could easily be twice the total projected abortion costs. Based on our analysis, the average cost in 1973 for all abortion services was about \$265, including screening, followup, and family planning services through the first postpartum visit. The average cost for vacuum aspiration abortion, including allowance for complications, was \$205. Other projections for vacuum aspiration abortions are presented in table 3.

Effects of Early Abortion

Educational efforts to encourage first-trimester abortions are especially appropriate, since second-trimester abortions are associated with considerably increased morbidity and mortality (16). If we assume that such efforts are successful in increasing the percentage of abortions performed in the first trimester, we can expect considerable reductions in resource requirements.

When the percentage of vacuum aspiration abortions increases, substantial decreases appear in costs and other resource requirements (table 4). When the percentage of vacuum aspiration abortions is doubled from 45 to 90 percent, the cost of providing services drops by \$68 million, or about one-third, because of the much lower cost of vacuum aspiration compared with saline infusion abortion. Even greater decreases occur in hospital patient-bed days because of the use of outpatient facilities for some vacuum aspiration procedures and because of the fewer number of hospital inpatient days needed compared with saline infusion procedures. Additionally, fewer physician man-hours are required to perform vacuum aspirations than to perform saline infusion. Finally, mortality is also decreased when more vacuum aspiration than saline infusion abortions are performed (6).

Concerning facilities for providing abortion services, a significant cost differential exists between inpatient and outpatient facilities. The feasibility of providing outpatient abortion services for early first-trimester abortion has been demonstrated (5). The significant cost and resource differential between inpatient and outpatient abortion by vacuum aspiration is shown

Table 3. Projections and estimates of the annual number of inpatient and outpaient abortions by vacuum aspiration and costs for services (including screening, followup, and family planning)

Condition for projections and estimates ¹	Number of out-patient abortions (thousands)	Number of in-patient abortions (thousands)	Costs of services (millions) ²
Based on nationwide:			
1973: 507,425 abortions.....	213.873	125.608	\$69.678
1975: 524,434 abortions.....	221.034	129.814	72.011
Based on Oregon:			
1973: 723,570 abortions.....	305.003	179.129	99.368
1975: 747,823 abortions.....	315.182	185.106	102.683
Based on New York:			
1973: 1,227,392 abortions.....	668.709	303.819	168.537
1975: 1,268,534 abortions.....	691.010	313.951	174.158

¹ Number of abortions from table 1. ² 1972 dollars; based on costs of providing services, not charges to patients.

Table 4. Effects of early abortion by vacuum aspiration procedures compared with other procedures on costs for services, hospital patient-bed days, and physician man-hours for 480,259 abortions annually nationwide¹

Procedure	Percent of abortions	Costs for services (millions) ²	Hospital patient-bed days (thousands)	Physician man-hours (thousands)
Vacuum aspiration.....	45	\$182.368	841.657	377.091
Curettage.....	8			
Amniocentesis.....	45			
Vacuum aspiration.....	67	127.389	408.687	288.277
Curettage.....	18			
Amniocentesis.....	13			
Vacuum aspiration.....	90	114.680	319.310	275.011
Curettage.....	3			
Amniocentesis.....	5			

¹ Recent nationwide number of abortions from table 1; assumes 1 percent of procedures are performed by hysterectomy or hysterotomy.

² 1972 dollars; based on the costs of providing services, not patient charges.

in table 5. With vacuum aspiration abortion, the cost drops from \$85 million to \$56 million when outpatient procedures increase from 10 to 90 percent. For all abortion patients, total hospital patient-bed days drop dramatically—from 579,000 to 322,000. Based on cost and resource requirements, substantial economies result from outpatient procedures. However, the use of free-standing clinics, rather than hospital-based clinics, may be associated with increased risk (17).

The trimester of pregnancy and the facilities in which abortions are performed vitally affect the resources required to respond to requests for abortion services. Early first-trimester abortion on an outpatient basis offers substantial economies from the perspective of costs, facilities required, and more efficient use of physician time.

Conclusions

The projection of resource requirements that depend on human behavior is sometimes difficult. Even when accurate and current information is available, many factors fail to remain as constant as the simplified assumptions required in the projection would assume. During the next few years, however, the provision of abortion services probably will not change as much in mode as in magnitude. For the long term, it would be difficult to predict the form in which these services will be provided, no less the magnitude of demand for such services.

The medical resources required for the levels of demand for abortion services that are pro-

jected here are not excessive. Further, increased efficiency in providing services, including more use of outpatient facilities, will reduce these requirements (table 5). Additional reductions are possible if more abortions are performed in the first trimester than in the second trimester. Finally, increased skill of physicians may result in lower morbidity rates and thus further reduce the total costs of abortion services.

Our projections reflect only one aspect of policy analysis related to abortion. Many other issues must be considered, including the potential long-term sequelae of induced abortion. Perhaps the most important unanswered question is the extent to which women might rely on abortion as

Table 5. Cost and resource differential between inpatient and outpatient abortions by vacuum aspiration procedures, based on 480,259 abortions annually nationwide

Facility	Percent of vacuum aspiration abortions	Costs for services (millions) ¹	Hospital patient-bed days (thousands) ²
Clinics	10	\$85.468	578.814
Hospitals	90		
Clinics	63	65.945	408.687
Hospitals	37		
Clinics	90	56.000	321.967
Hospitals	10		

¹ For vacuum aspiration patients only; in 1972 dollars and based on the costs of providing services, not patient charges.

² Includes all patients, not only vacuum aspiration patients.

a primary method of limiting fertility rather than as a backup method to contraceptive failure. It is hoped that women will realize the advantages of relying on contraception rather than abortion because the cost of providing contraceptive services is substantially less than that for abortion services, even including an allowance for abortion when contraception fails (18).

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WILLIAMS, STEPHEN J. (Harvard University School of Public Health), and McINTOSH, E. NOEL: National resource requirements for abortion services. *Public Health Reports*, Vol 89, September-October 1974, pp. 440-446.

The potential resource requirements of physician time, hospital patient-bed days, and costs for providing abortion services were estimated, based on projections of the number of women who might seek abortions in 1973 and 1975. Estimates of the number of such women were computed from the 1971 abortion rates of States which had nonrestrictive laws before the Supreme Court's 1973 decision that removed most restrictions on the practice of abortion.

Based on the experience in New York State, about 1.2 mil-

lion women might be expected to seek abortions nationwide. This level of demand would require about 400 full-time gynecologists, 3,000 hospital beds, and \$330 million a year. The abortion rate for Oregon, which was lower than that for New York, yielded a projected demand of 730,000 abortions a year that would require about 225 full-time gynecologists, 1,760 hospital beds, and \$195 million. Based on the 1971 nationwide abortion rates, which were lower than those of both New York and

Oregon, about 515,000 abortions would be performed, and the abortions would require about 150 full-time gynecologists, 1,140 hospital beds, and \$137 million a year.

Some substantial reductions in resource requirements could be achieved by educational efforts aimed at increasing the number of abortions performed in the first trimester. Additionally, substantial economies occur when abortions are performed, when appropriate, on an outpatient basis.